Puccinia Peckiana. The wonder is that the true nature of this exceedingly common fungus has remained so long unknown.

Although the cell rows forming the peridial wall in the aecidia of rusts are usually considered to be homologous with the spore chains, it is generally believed that the intercalary cells characteristic of the spore chains are not produced in the peridium. This belief is shown to be erroneous by KURSSANOW,[20] who has investigated the development of the aecidia of a number of rusts belonging to different types, and finds that a complete homology exists between the spore chains and the cell rows of the peridium. The basal cells of the peridium give rise to a series of cells each of which divides, cutting off a small cell in the lower outer corner. These small cells, which correspond to the intercalary cells, thus lie toward the outside of the rows of cells forming the peridial wall. By the growth of the peridial cells they are crowded still farther outward. Their walls soon become gelatinous and their structure is entirely obliterated, so that they are not recognizable in any but the youngest parts of the aecidium. This fate undoubtedly accounts for their remaining long unobserved. The basal cells of the peridial rows, as well as the peridial cells themselves and the "intercalary" cells, are binucleate, like the basal cells of the spore chains, in all cases except in a form of *Aecidium punctatum* Pers. (*Puccinia Pruni-spinosae* Pers.), which had uninucleate basal cells, giving rise to uninucleate aecidiospores and peridial cells. This form resembles in this respect the aecidium with uninucleate cells which was described by MOREAU[21] on *Euphorbia silvatica*. This form, which was the first aecidium having uninucleate cells discovered, has uninucleate basal cells also.—H. HASSELBRING.

Resistance of mosses to drought and cold.—It has long been known that many mosses are able to survive long periods of extreme drought, although much of this knowledge has been based upon inexact and insufficient data. It is a matter of much satisfaction, therefore, to have their resistance proved by the exact and extensive results of IRMSCHER[22] based upon careful experiments with a large range of species. He finds resistance to drying related in a remarkable degree to the ordinary habitat of the species, but often surprisingly great even for aquatic and mesophytic forms. Thus, while the leaves of some species of *Fontinalis* succumbed to a week's air-drying or to five days in a desiccator, *Philonotis fontana* and three species of *Hypnum* died only after 15–20 weeks in dry air or 10–18 weeks in the desiccator. The mesophytic species from deciduous forests, like *Barbula subulata*, *Bryum alpinum*, *Mnium*

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[20] KURSSANOW, L., Über die Peridienentwicklung im Aecidium. Ber. Deutsch. Bot. Gesells. **32**:317–327. *pl. 1.* 1914.

[21] MOREAU, Mrs. F., Sur l'existence d'une forme écidienne uninucléeé. Bull. Soc. Mycol. France **27**:489–492. *fig. 1.* 1911.

[22] IRMSCHER, E., Über die resistenz der Laubmoose gegen Austrocknung und Kält. Jahrb. Wiss. Bot. **50**:387–449. 1912.

rostratum, and *Catherinea undulata*, withstood 8–20 weeks in dry air and 5–13 weeks in the desiccator; and in species from the drier coniferous woods, like *Bartramia ityphylla*, *Dicranum fuscescens*, and *D. scoparium*, the resistance to dry air extended to 50 weeks and in the desiccator to 40 weeks. It should be noted that after all the leaves were thus killed, many of the plants were still capable of growth by fresh shoots from the more resistant stems.

The leaves of soil-growing mosses showed drought resistance in the desiccator for periods varying from 3 weeks for *Physcomitrium pyriforme*, 7 weeks for *Bryum pallens*, and 9 weeks for *Funaria hygrometrica*, to 15 weeks for *Bryum argenteum* and 35 weeks for *Pottia lanceolata*. Rock-inhabiting species included remarkably resistant forms, as *Grimmia pulvinata*, enduring 60 weeks of exposure in the desiccator, and *Schistidium apocarpum*, with one-fourth of it leaf cells still alive after 128 weeks of continuous exposure to dry air. Species from tree trunks showed resistance of the same order as those from the rocks.

Field observations show that alternate wetting and rapid drying are more detrimental in their effects than continuous drought; also, that the same species growing under different conditions varies in its drought resistance, the more hardy being that from drier habitats. Protonemata were correspondingly variable, withstanding the action of the desiccator for periods varying from 2 weeks for the cultivated protonema of *Funaria hygrometrica*, whose natural grown protonema was twice as resistant, to 14 and 15 weeks for the natural growing protonema of *Bryum argenteum* and *Catharinea undulata*. The sporophytes were found to be almost as hardy as the protonemata.

Experimental evidence from a large number of species points to great uniformity in the power of resisting cold. At −20° C. the leaves of most species were killed, whether they came from the aquatic, mesophytic, or xerophytic habitats, although in a few species the resistance extended to −30° C. Plants grown at a high temperature showed decidedly less resistance to sudden cold than those from cooler situations. Attention is also directed to the relation between turgor and the freezing point of the leaf cells, and to the behavior of the cells in various solutions.

The evidences of careful methods, the large number of species under experimentation, the abundance of the quantitative data, and the logical organization of the report are to be commended.—Geo. D. Fuller.

Composition and qualities of coal.—By improved methods of making thin coal sections, Jeffrey[23] claims to have obtained new and valuable results in the study of the composition of coal. In a brief discussion of the modes of accumulation he holds the view that at present both the accumulation as the result of heaping up of the remains of successive generations of plants in peat bogs, the autocthonous hypothesis, and the accumulation by drift in lakes or lagoons, the allocthonous hypothesis, commonly take place in the temperate

[23] Jeffrey, Edward C., On the composition and qualities of coal. Econ. Geol. 9:730–742. 1915.